

# EXHIBIT 11

**McGraw-Hill**

**DICTIONARY OF  
SCIENTIFIC AND  
TECHNICAL  
TERMS**

**Fifth Edition**

# **McGraw-Hill Dictionary of Scientific and Technical Terms**

## **Fifth Edition**

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**On the cover: Photomicrograph of crystals of vitamin B<sub>1</sub>.  
(Dennis Kunkel, University of Hawaii)**

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#### **McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS, Fifth Edition**

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## bridge abutment

brig | 269

for control and visual communications. [ORG CHEM] A connection between two different parts of a molecule consisting of a valence bond, an atom, or an unbranched chain of atoms. [PETRO ENG] 1. An obstruction in a borehole resulting from the wall caving or the presence of a large boulder. 2. A device installed in a borehole either permanently or temporarily to retain cement or other material. { 'brij }

**bridge abutment** [CIV ENG] The end foundation upon which the bridge superstructure rests. { 'brij əbət'mənt }

**bridge bearing** [CIV ENG] The support at a bridge pier carrying the weight of the bridge; may be fixed or seated on expansion rollers. { 'brij ,berɪŋ }

**bridge cable** [CIV ENG] Cable from which a roadway or truss is suspended in a suspension bridge; may be of pencil-thick wires laid parallel or strands of wire wound spirally. { 'brij ,kəbəl }

**bridge circuit** [ELEC] An electrical network consisting basically of four impedances connected in series to form a rectangle, with one pair of diagonally opposite corners connected to an input device and the other pair to an output device. { 'brij ,sərkət }

**bridge crane** [MECH ENG] A hoisting machine in which the hoisting apparatus is carried by a bridgelike structure spanning the area over which the crane operates. { 'brij ,kræn }

**bridge deck** [NAV ARCH] A partial deck above the main deck on merchant ships, usually near the middle of the ship. { 'brij ,dek }

**bridged intermediate** See bridged ion. { 'brijd ɪntər'mēd-ēət }

**bridged ion** [ORG CHEM] A reactive intermediate in which an atom from one of the reactants is bonded partially to each of two carbon atoms of a reactant containing a double carbon-to-carbon bond. Also known as bridged intermediate; cyclic ion. { 'brijd ɪ-ən }

**bridged tap** [ELEC] Portion of a cable pair connected to a circuit which is not a part of the useful path. { 'brijd 'təp }

**bridged-T network** [ELEC] A T network with a fourth branch connected between an input and an output terminal and across two branches of the network. { 'brijd 'tē 'net,wərk }

**bridge foundation** [CIV ENG] The piers and abutments of a bridge, on which the superstructure rests. { 'brij faʊn'dā-shən }

**bridge graft** [BOT] A plant graft in which each of several scions is grafted in two positions on the stock, one above and the other below an injury. { 'brij ,graft }

**bridge house** [NAV ARCH] A structure above the main deck near the middle of a ship whose top forms the bridge deck. { 'brij ,haʊs }

**bridge hybrid** See hybrid junction. { 'brij 'hɪbrəd }

**bridge limiter** [ELECTR] A device employed in analog computers to keep the value of a variable within specified limits. { 'brij 'lɪm-əd-ər }

**bridge magnetic amplifier** [ELECTR] A magnetic amplifier in which each of the gate windings is connected in series with an arm of a bridge rectifier; the rectifiers provide self-saturation and direct-current output. { 'brij mag'ned-ɪk 'amplə,fraɪər }

**bridge oscillator** [ELECTR] An oscillator using a balanced bridge circuit as the feedback network. { 'brij əs-ə'lād-ər }

**bridge pier** [CIV ENG] The main support for a bridge, upon which the bridge superstructure rests; constructed of masonry, steel, timber, or concrete founded on firm ground below river mud. { 'brij ,pɪr }

**bridge plug** [PETRO ENG] A downhole tool used to isolate a lower zone while an upper section is being tested or cemented; consists of slips, a plug mandrel, and a sealing element that is run and set in casing. { 'brij ,pləg }

**bridge rectifier** [ELECTR] A full-wave rectifier with four elements connected as a bridge circuit with direct voltage obtained from one pair of opposite junctions when alternating voltage is applied to the other pair. { 'brij ,rek-tə,fraɪər }

**bridge trolley** [MECH ENG] Either of the wheeled attachments at the ends of the bridge of an overhead traveling crane, permitting the bridge to move backward and forward on elevated tracks. { 'brij ,trɒl-ē }

**bridge vibration** [MECH] Mechanical vibration of a bridge superstructure due to natural and human-produced excitations. { 'brij vɪbrə'shən }

**bridgeway** [MECH ENG] A wall in a furnace over which the products of combustion flow. { 'brij ,wɛɪ }

**bridgeware** [COMPUT SCI] Software or hardware that trans-

lates programs or converts data from one format to another. { 'brij ,wer }

**bridging** [ELEC] 1. Connecting one electric circuit in parallel with another. 2. The action of a selector switch whose movable contact is wide enough to touch two adjacent contacts so that the circuit is not broken during contact transfer. [MATH] The operation of carrying in addition or multiplication. [MET] 1. Formation of arched cavities in a powder compact. 2. Jamming of the charge in a blast or a cupola furnace due to adherence of fine ore particles to the inner walls. 3. Formation of solidified metal over the top of the charge in a mold or crucible. [MIN ENG] The obstruction of the receiving opening in a material-crushing device by two or more pieces wedged together, each of which could easily pass through. { 'brij-ɪŋ }

**bridging amplifier** [ELECTR] Amplifier with an input impedance sufficiently high so that its input may be bridged across a circuit without substantially affecting the signal level of the circuit across which it is bridged. { 'brij-ɪŋ ,amplə,fraɪər }

**bridging connection** [ELECTR] Parallel connection by means of which some of the signal energy in a circuit may be withdrawn frequently, with imperceptible effect on the normal operation of the circuit. { 'brij-ɪŋ kə'nek-shən }

**bridging contacts** [ELEC] A contact form in which the moving contact touches two stationary contacts simultaneously during transfer. { 'brij-ɪŋ ,kən,təks }

**bridging ligand** [ORG CHEM] A ligand in which an atom or molecular species which is able to exist independently is simultaneously bonded to two or more metal atoms. { 'brij-ɪŋ ,lɪg-ənd }

**bridging loss** [ELECTR] Loss resulting from bridging an impedance across a transmission system; quantitatively, the ratio of the signal power delivered to that part of the system following the bridging point, and measured before the bridging, to the signal power delivered to the same part after the bridging. { 'brij-ɪŋ ,ləs }

**bridging material** [MATER] A fibrous, flaky, or granular substance added to a cement slurry or drilling fluid to seal a formation in which lost circulation has occurred. Also known as lost-circulation material. { 'brij-ɪŋ mə'tɪr-ē-əl }

**Bridgman anvil** [PHYS] A device for producing high static pressures using two large massive opposed pistons bearing on a small thin sample confined by a gasket material. { 'brijmən 'anvəl }

**Bridgman effect** [SOLID STATE] The phenomenon that when an electric current passes through an anisotropic crystal, there is an absorption or liberation of heat due to the nonuniformity in current distribution. { 'brijmən ɪ'fekt }

**Bridgman relation** [SOLID STATE]  $P = Q T \sigma$  in a metal or semiconductor, where  $P$  is the Ettingshausen coefficient,  $Q$  the Nernst-Ettingshausen coefficient,  $T$  the temperature, and  $\sigma$  the thermal conductivity in a transverse magnetic field. { 'brijmən rɪ'lā-shən }

**Bridgman sampler** [MIN ENG] A mechanical device that automatically selects two samples as the ore passes through. { 'brijmən ,səmp-lər }

**Bridgman technique** [SOLID STATE] A method of growing single crystals in which a vertical cylinder that tapers conically to a point at the bottom and contains the substance to be crystallized in molten form is slowly lowered into a cold zone, resulting in crystallization beginning at the tip. { 'brijmən tek'nɪk }

**bridle** [ENG] A pumping unit cable that is looped over the horse head and then connected to the carrier bar; supports the polished-rod clamp. { 'brɪd-əl }

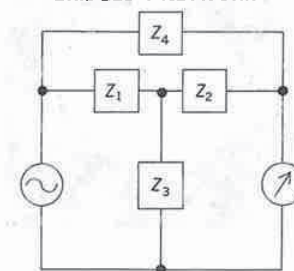
**bridled-cup anemometer** [ENG] A combination cup anemometer and pressure-plate anemometer, consisting of an array of cups about a vertical axis of rotation, the free rotation of which is restricted by a spring arrangement; by adjustment of the force constant of the spring, an angular displacement can be obtained which is proportional to wind velocity. { 'brɪd-əld 'kəp ən-ə'məm-əd-ər }

**bridled pressure plate** [METEOROL] An instrument for measuring air velocity in which the pressure on a plate exposed to the wind is balanced by the force of a spring, and the deflection of the plate is measured by an inductance-type transducer. { 'brɪd-əld 'presh-ər ,plæt }

**briefing** See pilot briefing. { 'brɛf-ɪŋ }

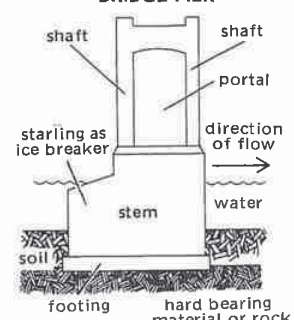
**brig** [PHYS] A unit to express the ratio of two quantities, as a logarithm to the base 10; that is, a ratio of  $10^x$  is equal to  $x$  brig;

BRIDGED-T NETWORK



Schematic circuit of bridged-T network.

BRIDGE PIER



Large bridge pier—vertical shafts with heavy portal and base.

BRIDGMAN ANVIL



Configuration of Bridgman anvil, a basic type of static high-pressure equipment.



ical action on the metal surface and effected by a current of electricity through an electrolyte. { i,lek-trō'kem-ə-kəl 'kōd-īŋ }

**electrochemical corrosion** [MET] Corrosion of a metal associated with the flow of electric current in an electrolyte. Also known as electrolytic corrosion. { i,lek-trō'kem-ə-kəl kə'rō-zhən }

**electrochemical effect** [PHYS CHEM] Conversion of chemical to electric energy, as in electrochemical cells; or the reverse process, used to produce elemental aluminum, magnesium, and bromine from compounds of these elements. { i,lek-trō'kem-ə-kəl i'fekt }

**electrochemical emf** [PHYS CHEM] Electrical force generated by means of chemical action, in manufactured cells (such as dry batteries) or by natural means (galvanic reaction). { i,lek-trō'kem-ə-kəl 'ē,em'ef }

**electrochemical equivalent** [PHYS CHEM] The weight in grams of a substance produced or consumed by electrolysis with 100% current efficiency during the flow of a quantity of electricity equal to 1 faraday (96,487.0  $\pm$  1.6 coulombs). { i,lek-trō'kem-ə-kəl i'kwiv-ə-lənt }

**electrochemical grinding** See electrolytic grinding. { i,lek-trō'kem-ə-kəl 'grīnd-īŋ }

**electrochemical machining** [MET] Removing excess metal by electrolytic dissolution, effected by the tool acting as the cathode against the workpiece acting as the anode. Abbreviated ECM. Also known as electrolytic machining. { i,lek-trō'kem-ə-kəl mə'shēn-īŋ }

**electrochemical potential** [PHYS CHEM] The difference in potential that exists when two dissimilar electrodes are connected through an external conducting circuit and the two electrodes are placed in a conducting solution so that electrochemical reactions occur. { i,lek-trō'kem-ə-kəl pə'ten-čəl }

**electrochemical power generation** [ENG] The direct conversion of chemical energy to electric energy, as in a battery or fuel cell. { i,lek-trō'kem-ə-kəl 'pau-ər jən-ə,rā-shən }

**electrochemical process** [PHYS CHEM] 1. A chemical change accompanying the passage of an electric current, especially as used in the preparation of commercially important quantities of certain chemical substances. 2. The reverse change, in which a chemical reaction is used as the source of energy to produce an electric current, as in a battery. { i,lek-trō'kem-ə-kəl 'prās-əs }

**electrochemical recording** [ELECTR] Recording by means of a chemical reaction brought about by the passage of signal-controlled current through the sensitized portion of the record sheet. { i,lek-trō'kem-ə-kəl ri'kōrd-īŋ }

**electrochemical reduction cell** [PHYS CHEM] The cathode component of an electrochemical cell, at which chemical reduction occurs (while at the anode, chemical oxidation occurs). { i,lek-trō'kem-ə-kəl ri'dəks-shən ,sel }

**electrochemical series** [PHYS CHEM] A series in which the metals and other substances are listed in the order of their chemical reactivity or electrode potentials, the most reactive at the top and the less reactive at the bottom. Also known as electromotive series. { i,lek-trō'kem-ə-kəl 'sir-ēz }

**electrochemical techniques** [PHYS CHEM] The experimental methods developed to study the physical and chemical phenomena associated with electron transfer at the interface of an electrode and solution. { i,lek-trō'kem-ə-kəl tek'nēks }

**electrochemical thermodynamics** [THERMO] The application of the laws of thermodynamics to electrochemical systems. { i,lek-trō'kem-ə-kəl ,thərm-ō'dī'nam-iks }

**electrochemical transducer** [ENG] A device which uses a chemical change to measure the input parameter; the output is a varying electrical signal proportional to the measurand. { i,lek-trō'kem-ə-kəl tranz'dü-sər }

**electrochemical valve** [ELEC] Electric valve consisting of a metal in contact with a solution or compound, across the boundary of which current flows more readily in one direction than in the other direction, and in which the valve action is accompanied by chemical changes. { i,lek-trō'kem-ə-kəl 'valv }

**electrochemiluminescence** [PHYS CHEM] Emission of light produced by an electrochemical reaction. Also known as electrogenerated chemiluminescence. { i,lek-trō'kem-ē-ō,lūm-ə'nes-əns }

**electrochemistry** [PHYS CHEM] A branch of chemistry dealing with chemical changes accompanying the passage of an electric current; or with the reverse process, in which a chemical

reaction is used to produce an electric current. { i'lek-trō'kem-ə'strē }

**electrochromatography** [ANALY CHEM] Type of chromatography that utilizes application of an electric potential to produce an electric differential. Also known as electropherography. { i'lek-trō,krō-mə'täg-rə-fē }

**electrochromic display** [ELECTR] A solid-state passive display that uses organic or inorganic insulating solids which change color when injected with positive or negative charges. { i'lek-trō'krō-mik di'splā }

**electrocoagulation** [MED] The coagulation of tissue by means of a high-frequency electric current. { i'lek-trō-kō-ag-yə'lā-shən }

**electroconvulsive shock** [MED] The technique of eliciting convulsions by applying an electric current through the brain for a brief period. { i'lek-trō-kən,vəl'siv 'shāk }

**electrocorticogram** [MED] The record obtained by electrocortigraphy. { i'lek-trō'kōrd-ə-kə,gram }

**electrocortigraphy** [MED] The technique of surveying the electrical activity of the cerebral cortex. { i'lek-trō,kōrd-ə'käg-rə-fē }

**electrocratic** [CHEM] Referring to the repulsion exhibited by soap films and other colloids in solutions; such repulsion involves a strong osmotic contribution but is largely controlled by electrical forces. { i,lek-trō'krad-ik }

**electroculogram** [PHYSIO] A record of the standing voltage between the front and back of the eye that is correlated with eyeball movement and obtained by electrodes placed on the skin near the eye. { i,lek-trō'kyū-l-ə,gram }

**electroculography** [PHYSIO] The production and study of electroculograms. { i'lek-trō'kyū-läg-rə-fē }

**electrocyclic reaction** [PHYS CHEM] The interconversion of a linear  $\pi$ -system containing  $n$   $\pi$ -electrons and a cyclic molecule containing  $(n - 2)$   $\pi$ -electrons which is formed by joining the ends of the linear molecule. { i,lek-trō'sīk-lik rē'ak-shən }

**electrode** [ELEC] 1. An electric conductor through which an electric current enters or leaves a medium, whether it be an electrolytic solution, solid, molten mass, gas, or vacuum. 2. One of the terminals used in dielectric heating or diathermy for applying the high-frequency electric field to the material being heated. { i'lek,trōd }

**electrode admittance** [ELECTR] Quotient of dividing the alternating component of the electrode current by the alternating component of the electrode voltage, all other electrode voltages being maintained constant. { i'lek,trōd ad'mit-əns }

**electrodecentration** [PHYS CHEM] A modification of electrodialysis in which a cell is divided into three sections by two membranes and electrodes are placed in the end sections; colloidal matter is concentrated at the sides and bottom of the middle section, and the liquid that floats to the top is drawn off. { i'lek-trō,dē,kən'tā-shən }

**electrode capacitance** [ELECTR] Capacitance between one electrode and all the other electrodes connected together. { i'lek,trōd kə'pas-əd-əns }

**electrode characteristic** [ELECTR] Relation between the electrode voltage and the current to an electrode, all other electrode voltages being maintained constant. { i'lek,trōd ,kə'rik-tə'ris-tik }

**electrode conductance** [ELECTR] Quotient of the inphase component of the electrode alternating current by the electrode alternating voltage, all other electrode voltage being maintained constant; this is a variational and not a total conductance. Also known as grid conductance. { i'lek,trōd kən'dəkt-əns }

**electrode couple** [ELEC] The pair of electrodes in an electric cell, between which there is a potential difference. { i'lek,trōd ,kə-pəl }

**electrode current** [ELECTR] Current passing to or from an electrode, through the interelectrode space within a vacuum tube. { i'lek,trōd ,kə-rənt }

**electrode dark current** [ELECTR] The electrode current that flows when there is no radiant flux incident on the photocathode in a phototube or camera tube. Also known as dark current. { i'lek,trōd 'dārk 'kə-rənt }

**electrode dissipation** [ELECTR] Power dissipated in the form of heat by an electrode as a result of electron or ion bombardment. { i'lek,trōd ,dis-ə'pā-shən }

**electrode drop** [ELECTR] Voltage drop in the electrode due to its resistance. { i'lek,trōd ,drāp }

**electrode efficiency** [PHYS CHEM] The ratio of the amount



**quantum hypothesis** [QUANT MECH] A hypothesis that some physical quantity can assume only a certain discrete set of values; examples are Planck's law, and the condition in the Bohr-Sommerfeld theory that the action integral of a system must be an integral multiple of Planck's constant. { 'kwān-təm hī'pāth-ə'səs }

**quantumization distortion** See quantization distortion. { 'kwān-tə-mə'zā-shən dī,stōr-shən }

**quantumization noise** See quantization distortion. { 'kwān-tə-mə'zā-shən ,nōiz }

**quantum jump** [QUANT MECH] The transition of a quantum system from one stationary state to another, accompanied by emission or absorption of energy. { 'kwān-təm 'jəmp }

**quantum limit** [SPECT] The shortest wavelength present in a continuous x-ray spectrum. Also known as boundary wavelength; end radiation. { 'kwān-təm 'līm-ət }

**quantum-mechanical operator** [QUANT MECH] A linear, Hermitian operator associated with some physical quantity; for a physical system in any state, the expectation value of the physical quantity equals the integral over configuration space of  $\psi^*(A\psi)$ , where  $A\psi$  is the result of the operator acting on the wave function of the system, and  $\psi^*$  is the complex conjugate of the wave function. { 'kwān-təm mī'kan-əkəl ,āp-ə,rād-ər }

**quantum mechanics** [PHYS] The modern theory of matter, of electromagnetic radiation, and of the interaction between matter and radiation; it differs from classical physics, which it generalizes and supersedes, mainly in the realm of atomic and subatomic phenomena. Also known as quantum theory. { 'kwān-təm mī'kan-iks }

**quantum mineralogy** [MINERAL] A branch of mineralogy concerned with the application of quantum mechanics to mineralogical systems. { 'kwān-təm ,mīn-ə'rāl-ə'jē }

**quantum nondemolition measurement** [QUANT MECH] A measurement of a physical observable of some system without altering its value. { 'kwān-təm ,nān,dem-ə'lish-ən 'mez-ər-mənt }

**quantum number** [QUANT MECH] One of the quantities, usually discrete with integer or half-integer values, needed to characterize a quantum state of a physical system; they are usually eigenvalues of quantum-mechanical operators or integers sequentially assigned to these eigenvalues. { 'kwān-təm ,nəm-bər }

**quantum of action** See Planck's constant. { 'kwān-təm əv 'ak-shən }

**quantum solid** [SOLID STATE] A solid whose atoms or molecules undergo large zero-point motion even in the quantum ground state (at absolute zero temperature) as a result of their small mass and the weak attractive part of their interaction potential. { 'kwān-təm ,səl-əd }

**quantum state** [QUANT MECH] 1. The condition of a physical system as described by a wave function; the function may be simultaneously an eigenfunction of one or more quantum-mechanical operators; the eigenvalues are then the quantum numbers that label the state. 2. See energy state. { 'kwān-təm ,stāt }

**quantum statistics** [STAT MECH] The statistical description of particles or systems of particles whose behavior must be described by quantum mechanics rather than classical mechanics. { 'kwān-təm stə'tis-tiks }

**quantum theory** See quantum mechanics. { 'kwān-təm ,thē-ə-rē }

**quantum theory of heat capacity** [STAT MECH] Application of quantum statistics to calculate heat capacities of various substances; an important result of the theory is the decrease of specific heats at low temperatures to values smaller than their classical values as a result of energy quantization. { 'kwān-təm ,thē-ə-rē əv 'hēt kə,pas-əd-ē }

**quantum theory of light** See quantum electrodynamics. { 'kwān-təm ,thē-ə-rē əv 'līt }

**quantum theory of radiation** [QUANT MECH] 1. The theory of heat radiation based on Planck's law; its principal result is the Planck radiation formula. 2. See quantum electrodynamics. { 'kwān-təm ,thē-ə-rē əv ,rād-ē'ā-shən }

**quantum theory of spectra** [QUANT MECH] The contemporary theory of spectra, based on the idea that an atom, molecule, or nucleus can exist only in certain allowed energy states, that it emits or absorbs energy as it changes from one state to another, and that the frequency of the associated electromagnetic radiation equals the difference in energies of two states divided by Planck's constant. { 'kwān-təm ,thē-ə-rē əv 'spek-trə }

**quantum theory of valence** [PHYS CHEM] The theory of valence based on quantum mechanics; it accounts for many experimental facts, explains the stability of a chemical bond, and allows the correlation and prediction of many different properties of molecules not possible in earlier theories. { 'kwān-təm ,thē-ə-rē əv 'vā-ləns }

**quantum turbulence** [CRYO] A phenomenon observed in a channel filled with superfluid and subjected to a heat flux which exceeds a certain critical value, in which the superfluid becomes filled with a tangled mass of quantized vortex lines. { 'kwān-təm 'tər-byə-ləns }

**quantum-wave equation** [QUANT MECH] A partial differential equation which relates the spatial and time dependences of the wave function of a system of one or more atomic or subatomic particles; examples are the Schrödinger equation in nonrelativistic quantum mechanics, and the Klein-Gordon, Dirac, Rarita-Schwinger and Proca equations in relativistic quantum mechanics. { 'kwān-təm ,wāv i,kwā-zhən }

**quantum well** [ELECTR] A thin layer of material (typically between 1 and 10 nanometers thick) within which the potential energy of an electron is less than outside the layer, so that the motion of the electron perpendicular to the layer is quantized. { 'kwān-təm 'wel }

**quantum wire** [ELECTR] A strip of conducting material about 10 nanometers or less in width and thickness that displays quantum-mechanical effects such as the Aharonov-Bohm effect and universal conductance fluctuations. { 'kwān-təm 'wīr }

**quantum yield** [PHYS CHEM] For a photochemical reaction, the number of moles of a stated reactant disappearing, or the number of moles of a stated product produced, per einstein of light of the stated wavelength absorbed. { 'kwān-təm 'yēld }

**quaquaversal** [GEOL] Of strata and geologic structures, dipping outward in all directions away from a central point. { 'kwā-kwə'vərsəl }

**quarantine** [MED] Limitation of freedom of movement of susceptible individuals who have been exposed to communicable disease, for a period of time equal to the incubation period of the disease. { 'kwār-ən,tən }

**quarantine anchorage** [CIV ENG] An area where a vessel anchors when satisfying quarantine regulations. { 'kwār-ən,tən ,əŋ'kər-ij }

**quarantine buoy** [NAV] A buoy marking the location of a quarantine anchorage. { 'kwār-ən,tən ,bōi }

**quark** [PARTIC PHYS] One of the hypothetical basic particles, having charges whose magnitudes are one-third or two-thirds of the electron charge, from which many of the elementary particles may, in theory, be built up; for example, nucleons may be formed from three quarks and mesons from quark-antiquark combinations; no experimental evidence for the actual existence of free quarks has been found. { 'kwärk }

**quark confinement** [PARTIC PHYS] The phenomenon wherein quarks can never be removed from the hadrons they compose, even though the interactions between them are relatively weak. { 'kwärk kən,fīn-mənt }

**quark-gluon plasma** [NUC PHYS] A state of nuclear matter postulated by quantum chromodynamics to exist at extremely high temperatures and densities in which the neutrons and protons lose their identities and the quarks and gluons form an unstructured collection of particles. { 'kwärk 'glü,än ,plaz-mə }

**quarkonium** [PARTIC PHYS] A meson that is made up of a heavy quark and its antiparticle, an antiquark. { 'kwär'kō-nē-əm }

**quark star** [ASTRON] A hypothetical star so dense that the nucleons have lost their identity and stability is derived from degenerate quarks. { 'kwärk ,stär }

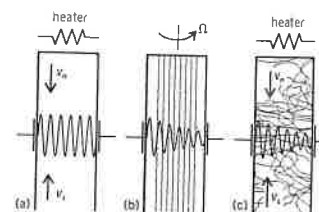
**quarry** [ENG] An open or surface working or excavation for the extraction of building stone, ore, coal, gravel, or minerals. { 'kwär-ē }

**quarry bar** [ENG] A horizontal bar with legs at each end, used to carry machine drills. { 'kwär-ē ,bär }

**quarry face** [MIN ENG] The freshly split face of ashlar, squared off for the joints only and used for massive work. { 'kwär-ē ,fäs }

**quarrying** [ENG] The surface exploitation and removal of stone or mineral deposits from the earth's crust. [GEOL] See plucking. { 'kwär-ē-ŋ }

# QUANTUM TURBULENCE



Wide-channel counterflow experiments. (a) Heat flux produced by the heater is subcritical, producing smooth counterflow of the superfluid (velocity  $v_s$ ) and normal fluid (velocity  $v_n$ ). (b) Heater is turned off and the channel is rotated at an angular velocity  $\Omega$  to produce a uniform array of quantized vortices. (c) Heat flux is supercritical, producing a tangle of quantized vortices (quantum turbulence).



**transmitter on** [COMMUN] A signal sent by a receiving device to a transmitter, directing it to transmit any information it has to send. Abbreviated XON. { tranz'mid-ər 'ɒn }

**transmitter-receiver** See transceiver. { tranz'mid-ər ri'sē-vər }

**transmitter synchro** See synchro transmitter. { tranz'mid-ər ,siŋ-kro }

**transmitting loop loss** [COMMUN] That part of the repetition equivalent assignable to the station set, subscriber line, and battery supply circuit which is on the transmitting end. { tranz'mid-iŋ 'lʊp ,ləs }

**transmitting mode** [COMPUT SCI] Condition of an input/output device, such as a magnetic tape when it is actually reading or writing. { tranz'mid-iŋ ,mɒd }

**transmittivity** [ELECTROMAG] The internal transmittance of a piece of nondiffusing substance of unit thickness. { ,trans-mə'tiv-əd-ē }

**transmutation** [NUC PHYS] A nuclear process in which one nuclide is transformed into the nuclide of a different element. Also known as nuclear transformation. { ,trans-myū'tā-shən }

**transobuoy** [ENG] A free-floating or moored automatic weather station developed for the purpose of providing weather reports from the open oceans; it transmits barometric pressure, air temperature, sea-water temperature, and wind speed and direction. { ,trans-ə,bɔi }

**transolver** [ELEC] A synchro having a two-phase cylindrical rotor within a three-phase stator, for use as a transmitter or a control transformer with no degradation of accuracy or nulls. { tran'sāl-vər }

**transom** [BUILD] A window above a door. [NAV ARCH] The flat, vertical aft end of a ship or boat as distinguished from a canoe-shaped or cruiser stern. { ,transəm }

**transonic** [PHYS] That which occurs or is occurring within the range of speed in which flow patterns change from subsonic to supersonic (or vice versa), about Mach 0.8 to 1.2, as in transonic flight or transonic flutter. { tran'sən-ik }

**transonic flight** [AERO ENG] Flight of vehicles at speeds near the speed of sound (660 miles per hour or 1060 kilometers per hour, at 35,000 feet or 10,700 meters altitude), characterized by great increase in drag, decrease in lift at any altitude, and abrupt changes in the moments acting on the aircraft; the vehicle may shake or buffet. { tran'sən-ik 'flīt }

**transonic flow** [FL MECH] Flow of a fluid over a body in the range just above and just below the acoustic velocity. { tran'sən-ik 'flɒ }

**transonic range** [FL MECH] The range of speeds between the speed at which one point on a body reaches supersonic speed, and the speed at which all points reach supersonic speed. { tran'sən-ik 'rænʒ }

**transonic speed** [FL MECH] The speed of a body relative to the surrounding fluid at which the flow is in some places on the body subsonic and in other places supersonic. { tran'sən-ik 'spɛd }

**transonic wind tunnel** [ENG] A type of high-speed wind tunnel capable of testing the effects of airflow past an object at speeds near the speed of sound, Mach 0.7 to 1.4; sonic speed occurs where the cross section of the tunnel is at a minimum, that is, where the test object is located. { tran'sən-ik 'wind ,tʌn-əl }

**transorbital lobotomy** [MED] A lobotomy performed through the roof of the orbit. { tranz'ɒr-bəd-əl lə'bəd-ə-mē }

**transosonde** [ENG] The flight of a constant-level balloon, whose trajectory is determined by tracking with radio-direction-finding equipment; thus, it is a form of upper-air, quasi-horizontal sounding. { ,tran-zə,sənd }

**transparency** [GRAPHICS] An image fixed on a clear base by means of a photographic, printing, chemical, or other process, especially adaptable for viewing by transmitted light. [OPTICS] The ability of a substance to transmit light of different wavelengths, sometimes measured in percent of radiation which penetrates a distance of 1 meter. { tranz'par-ən-sē }

**transparency range** [NUC PHYS] A postulated energy range for extremely high-energy heavy-ion collisions in which the projectile passes through the target and emerges with its temperature and density raised to the point at which a quark-gluon plasma forms. { tranz'par-ən-sē ,rænʒ }

**transparent** [COMPUT SCI] Pertaining to a device or system that processes data without the user being aware of or needing to understand its operation. [PHYS] Permitting passage of radiation or particles. { tranz'par-ənt }

**transparent medium** [OPTICS] 1. A medium which has the property of transmitting rays of light in such a way that the human eye may see through the medium distinctly. 2. A medium transparent to other regions of the electromagnetic spectrum, such as x-rays and microwaves. { tranz'par-ənt 'mēd-ē-əm }

**transparent sky cover** [METEOROL] In United States weather-observing practice, that portion of sky cover through which higher clouds and blue sky may be observed; opposed to opaque sky cover. { tranz'par-ənt 'skɪ ,kəv-ər }

**transpassive region** [PHYS CHEM] That portion of an anodic polarization curve in which metal dissolution increases as the potential becomes noble. { tranz'pas-iv 'rē-jən }

**transphaser** [OPTICS] A nonlinear optical device that uses one light beam to modulate another, in a manner analogous to an electronic transistor, and that operates through the transference of a phase shift from one beam to the other. { ,tranz'fāz-ər }

**transpiration** [BIOL] The passage of a gas or liquid (in the form of vapor) through the skin, a membrane, or other tissue. { ,tranz-pə'rā-shən }

**transpiration cooling** See sweat cooling. { ,tranz-pə'rā-shən 'kʊl-iŋ }

**transplantation** [BIOL] 1. The artificial removal of part of an organism and its replacement in the body of the same or of a different individual. 2. To remove a plant from one location and replant it in another place. { ,tranz-plan'tā-shən }

**transplantation antigen** [IMMUNOL] An antigen in a cell which induces a histocompatibility reaction when the cell is transplanted into an organism not having that antigen. { ,tranz-plan'tā-shən 'anti-jən }

**transplantation disease** [MED] Disease ascribable to an immunological graft-versus-host reaction which occurs after transplantation of adult lymphoid cells to incompatible recipients who cannot reject them. { ,tranz-plan'tā-shən di,zēz }

**transplanter** [AGR] A special kind of equipment designed for the planting of cuttings or small plants; it transports one or more workers who assist the action of the machine in placing plants in a furrow and covering them; it commonly supplies a small quantity of water to each plant. { tranz'plan-tər }

**transplutonium element** [INORG CHEM] An element having an atomic number greater than that of plutonium (94). { ,tranz-plə'tō-nē-əm 'el-ə-mənt }

**transpolarizer** [ELEC] An electrostatically controlled circuit impedance that can have about 30 discrete and reproducible impedance values: two capacitors, each having a crystalline ferroelectric dielectric with a nearly rectangular hysteresis loop, are connected in series and act as a single low impedance to an alternating-current sensing signal when both capacitors are polarized in the same direction; application of 1-microsecond pulses of appropriate polarity increases the impedance in steps. { tranz'pō-lə,rīz-ər }

**transponder** [COMMUN] A transmitter-receiver capable of accepting the challenge of an interrogator and automatically transmitting an appropriate reply. { tranz'pän-dər }

**transponder beacon** See responder beacon. { tranz'pän-dər ,bē-kən }

**transponder dead time** [ELECTR] Time interval between the start of a pulse and the earliest instant at which a new pulse can be received or produced by a transponder. { tranz'pän-dər 'ded ,tɪm }

**transponder set** [ELECTR] A complete electronic set which is designed to receive an interrogation signal, and which retransmits coded signals that can be interpreted by the interrogating station; it may also utilize the received signal for actuation of additional equipment such as local indicators or servo amplifiers. { tranz'pän-dər ,set }

**transponder suppressed time delay** [ELECTR] Overall fixed time delay between reception of an interrogation and transmission of a reply to this interrogation. { tranz'pän-dər sə'prest 'tɪm di,lā }

**transport** [COMPUT SCI] 1. To convey as a whole from one storage device to another in a digital computer. 2. See tape transport. [ENG] Conveyance equipment such as vehicular transport, hydraulic transport, and conveyor-belt setups. [NAV ARCH] A ship designed to carry military personnel from one place to another. Also known as troop ship. { ,trans'pɔrt (verb), 'tranz,pɔrt (noun) }

**transportable computer** [COMPUT SCI] A microcomputer